

EXTENSIBLE ADAPTABLE SIMULATION SYSTEMS: SUPPORTING MULTIPLE FIDELITY SIMULATIONS IN A COMMON ENVIRONMENT

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ABSTRACT

Common practice in the development of simulation systems is meeting all user requirements within a single instantiation. The Joint Polar Satellite System (JPSS) presents a unique challenge to establish a simulation environment that meets the needs of a diverse user community while also spanning a multi-mission environment over decades of operation. In response, the JPSS Flight Vehicle Test Suite (FVTS) is architected with an extensible infrastructure that supports the operation of multiple observatory simulations for a single mission and multiple mission within a common system perimeter. For the JPSS-1 satellite, multiple fidelity flight observatory simulations are necessary to support the distinct user communities consisting of the Common Ground System development team, the Common Ground System Integration & Test team, and the Mission Rehearsal Team/Mission Operations Team. These key requirements present several challenges to FVTS development. First, the FVTS must ensure all critical user requirements are satisfied by *at least* one fidelity instance of the observatory simulation. Second, the FVTS must allow for tailoring of the system instances to function in diverse operational environments from the High-security operations environment at NOAA Satellite Operations Facility (NSOF) to the ground system factory floor. Finally, the FVTS must provide the ability to execute sustaining engineering activities on a subset of the system without impacting system availability to parallel users. The FVTS approach of allowing for multiple fidelity copies of observatory simulations represents a unique concept in simulator capability development and corresponds to the JPSS Ground System goals of establishing a capability that is flexible, extensible, and adaptable.